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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/559,757	04/27/2000	Yoshio Ozawa	04329.2306	2923

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EXAMINER

PHAM, THANH V

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 03/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/559,757

Applicant(s)

OZAWA ET AL.

Examiner

Thanh V Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 February 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-19 is/are pending in the application.
- 4a) Of the above claim(s) 16-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Procedural Issues

1. Applicant requests to acknowledge the replacement drawings. However, the replacement filed 02/18/04, with switching labels of fig. 17 and fig.18 of the two drawings such that fig. 18 is Prior Art, different from the Brief Description on page 19 wherein fig. 17 being Prior Art. Applicant is required to correct this error.
2. The replacement drawing, the amended title and specification filed 09/16/03 are acknowledged.

Response to Arguments

3. Applicant's argument ^{depends} ~~based~~ on the paragraph of MPEP 2143 on page 8 of the Remark filed 02/18/04 about establishment a prima facie case of obviousness.

Applicant begins with the added limitation and states: "in Hisamune's thermal oxidation process (See Hisamune's col. 2, line 55, to col. 3, line 29), only a small amount of oxygen radicals are generated. A thermal oxidation process is a process included in the method of reacting an oxygen molecule (O₂) with silicon to form a silicon oxide film, but not related to a method of reacting oxygen *radicals* with silicon to form a silicon oxide film. In other words, a thermal oxidation process is not a process in which a large amount of oxygen radicals are positively generated. Therefore, Hisamune's method does not enable sufficient oxidization of the surface of an insulating film

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containing silicon and nitrogen by oxygen radicals, and is therefore different from the present claimed invention.”

Firstly, how large for “a large amount” of oxygen being need is not claimed.

Secondly, the pointed-to paragraph by the applicant (the instant specification’s page 12) that support the claimed limitation clearly states: “the oxygen *radicals* may be generated on the surface of the sample” and the method that followed, “the similar phenomenon occurs with ozone oxidation and oxidation with oxygen *radicals*” and are what Hisamune teaches (*Hisamune's col. 2, line 55, to col. 3, line 29*).

4. In response to applicant's argument that there is no suggestion to combine the references on page 9, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the applicant's admitted prior art teaches every step of the instant invention but lacks oxidizing gas containing one of ozone and oxygen radicals; the Hisamune serves to cure the deficiency of applicant's admitted prior art.

5. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning on page 10, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge

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which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

6. In response to applicant's argument that "such combination of these references *a priori* fails to establish obviousness of the claimed invention" on page 11, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

7. In response to applicant's arguments against the references individually of Hisamune on claims 8 and 11 on page 11, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

8. In response to applicant's argument that no reasonable expectation of success expected in the combination on page 12, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative

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difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

Response to Amendment

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claims 8-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicants' admitted prior art in combination with Hisamune US Patent No 6,414,352 B1 and Takeuchi US Patent No 5,907,183.

In the description of the prior art of fig. 15, the applicants disclose that an insulating film containing silicon and nitrogen 2 is formed on the substrate 1; a film which must be processed and which contains silicon 3 is formed on the insulating film; those films are processed such that a portion of the insulating film is exposed to the outside; the structure obtained in the previous steps is subjected to an oxidation process.

The applicants' admitted prior art does not provide, in the oxidation step, oxidizing gas containing one of ozone and oxygen radicals.

The Hisamune reference discloses oxidation processes are required after forming the gates and recognizes that the oxygen radical created within a furnace, while proceeding the conventional oxidation step, would diverge through the separating regions and the known "gate bird's beak" exists (col. 2, line 55 - col. 3, line 29).

To employ the oxidation process with conventional oxidizing gas containing one of ozone and oxygen radicals of Hisamune to the oxidation process of applicants' admitted prior art would have been obvious to one of ordinary skill in the art as the oxidizing gas containing one of ozone and oxygen radicals as recognized as conventional by Hisamune would be selected in order to prevent dielectric failure in insulating layer in accordance with the oxidation step as taught by applicants' admitted prior art.

The Takeuchi reference discloses ten conventional examples for Si-N bonds at the interface between the second gate insulating film and the floating gate electrode (col.4, line 8 - col. 5, line 29) wherein example (8) teaches that silicon oxide film is formed and is annealed in a nitrogen-containing gas then a silicon nitride film is formed on the silicon oxynitride film (col. 5, lines 11-18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply further the steps of Takeuchi into the above combination of Hisamune with applicants' admitted prior art process. The use of silicon oxide film containing nitrogen and a silicon nitride film as the insulating film is well known to those skilled in the art as taught by Takeuchi.

The critical concentration of $5 \times 10^{13} \text{ cm}^{-2}$ nitrogen in the interface of silicon oxynitride film with the silicon substrate would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular concentration to overcome

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applicants' admitted prior art constraint (specification's page 21), and it appears that the process would possess utility using this concentration.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh V. Pham whose telephone number is 571-272-1866. The examiner can normally be reached on M-T (6:30-5:00).

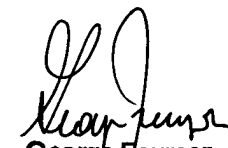
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TvP

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03/16/04


George Fourson
Primary Examiner